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What is claimed is:

1. A method for producing zinc sulfide electroluminophores using the following process steps:

   1. Preparation of a fine-grain zinc sulfide by precipitation of zinc sulfide from the solutions of suitable zinc salts with H_2S.

   2. Mixing of the obtained fine-grain zinc sulfide with the activator and coactivator compounds required for the luminophore synthesis.

   3. Firing of the obtained mixtures in the temperature range of 800 up to a maximum of 1000°C in the presence of fluxing agents with an only slightly mineralizing effect selected from the compound classes of the fluorides and/or bromides and/or iodides.

   4. Treatment of the powdery electroluminophores obtained according to step 3 with organic and/or inorganic acids in an acid bath while stirring, as well as washing, neutralizing and optionally filtering off and drying the zinc sulfide electroluminophores.

2. A method according to claim 1, characterized in that the precipitation of the fine-grain zinc sulfide takes place by passing H_2S into zinc salt solutions, such as $ZnSO_4$, $Zn(NO_3)_2$ and $ZnCl_3$, preferably by passing H_2S into zinc sulfate solutions with zinc ion concentrations of 0.25 moles/l to 2.0 moles/l at temperatures between 20 and 80°C and a pH of 0.5 to 3.0.

3. A method according to claim 1 and 2, characterized in that the activator and coactivator compounds required in process step 2 are added to the washed ZnS suspension as early as during the precipitation of the fine-grain zinc sulfide taking place during the first process step, or immediately after completion of the precipitation.

4. A method according to claim 1, characterized in that the required activator and coactivator compounds are blended in process step 2 in dry form, initially with a portion of the washed and dried fine-grain zinc sulfide obtained after the first process step, and that this mixture is then combined with the remaining amount of fine-grain ZnS required to preserve the desired luminophore composition.

5. A method according to claim 3 and 4, characterized in that the added activator and coactivator compounds are copper sulfate and/or tetrachloroauric acid or the corresponding sodium salt and/or manganese sulfate and/or aluminum nitrate.

6. A method according to claim 1, characterized in that no strongly mineralizing fluxing agent, particularly no chloride-containing fluxing agent is added to the starting mixture for the firing process according to process step 3.

7. A method according to claim 1, characterized in that an only slightly mineralizing fluxing agent selected from the compound classes of the fluorides and/or bromides, and/or iodides is added to the starting mixture for the firing process according to process step 3, which contains, in addition to the halide anions, cationic components, e.g., Al^{3+} ions, that act as coactivators.

8. A method according to claim 6 and 7, characterized in that the firing in step 3 takes place in air or in an inert nitrogen atmosphere or in an atmosphere consisting of a gas mixture of nitrogen and 1 to 10% hydrogen.

9. A method according to claim 8, characterized in that the obtained fired material is cooled to

room temperature after completion of the firing process in step 3, washed with deionized water and subsequently optionally filtered and dried.

10. A method according to claim 1, characterized in that the acid treatment in process step 4 takes place in an acid bath with organic acids, e.g., acetic acid or citric acid, or with inorganic mineral acids, such as hydrochloric acid, nitric acid or sulfuric acid, with retention times of 10 minutes to 10 hours at temperatures between 20 and 60°C.

11. A method according to claim 10, characterized in that the acid treatment in process step 4 takes place with an approximately 37% HCl solution for 2 to 6 hours while stirring at room temperature.

12. A method according to claim 10, characterized in that the acid treatment in step 4 takes place with a 10 to 20% citric acid solution for 4 to 8 hours at 60°C while stirring.

13. A method according to any of claims 1 - 12, characterized in that after the washing, neutralizing and optionally performed filtering and drying of the electroluminophores obtained after step 4, a re-doping takes place in process step 5 with certain quantities of the activator and coactivator compounds.

14. A method according to claim 13, characterized in that the re-doping takes place with copper and/or gold and/or manganese and/or aluminum compounds.

15. A method according to claim 13 and 14, characterized in that the compounds used for the re-doping are preferably copper sulfate, and/or tetrachloroauric acid or the corresponding sodium salt and/or manganese sulfate and/or aluminum nitrate.

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16. A method according to any of claims 13 - 15, characterized in that the re-doping takes place by means of a 30-minute to 10-hour firing in a temperature range between 300°C and 800°C.

17. A method according to any of claims 13 - 16, characterized in that the re-doping takes place in air or in an inert nitrogen atmosphere consisting of a mixture of nitrogen and 1 to 10% hydrogen.

18. A method according to any of claims 13 - 17, characterized in that, after cooling to room temperature, the firing product is washed with mineral acids, e.g., nitric acid and/or KCN solution to remove activator and/or coactivator materials that may have precipitated on the surface of the zinc sulfide electroluminophores.

19. A method according to any of claims 13 - 18, characterized in that the zinc sulfide electroluminophores are washed to pH neutrality with deionized water and subsequently filtered and dried after their treatment with mineral acids or KCN solution following the re-doping.

20. A method according to any of claims 1 - 19, characterized in that an annealing of the electroluminophores takes place in a 6^{th} process step at a temperature in the range between 200° and 500°C, with the annealing time amounting from 30 minutes to 5 hours.

21. A method according to claim 20, characterized in that the annealing process takes place in air or in an inert nitrogen atmosphere or in an atmosphere consisting of a mixture of nitrogen and 1 to 10% hydrogen.

22. A zinc sulfide electroluminophore having a cubic crystal structure and characteristic

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structural composition, characterized in that the luminophore particles have typical average grain sizes of 2 to 5 µm.

23. A zinc sulfide electroluminophore having a cubic crystal structure and characteristic structural composition, characterized in that the luminophore particles have typical average grain sizes of 5 to 15 µm.

24. A zinc sulfide electroluminophore according to claim 22 or 23, characterized in that the luminophore particles are coated with thin organic and/or crystalline or amorphous inorganic protective layers to further increase their service life.

25. A zinc sulfide electroluminophore according to claim 24, characterized in that the protective layer consists of an inner metal oxide film and an outer silicon nitrate film.

26. A zinc sulfide electroluminophore according to one or more of claims 22 - 25, characterized in that the luminophore particles are dispersible in a screen printing ink and preferably usable for printing in narrow-mesh screens (120 meshes/inch).

27. A zinc sulfide electroluminophore according to one or more of claims 22 - 25, characterized in that the luminophore particles are dispersible and usable for printing in a halftone photogravure ink or flexographic printing ink or offset printing ink or letterset printing ink or gravure printing ink.

28. A zinc sulfide electroluminophore according to one or more of claims 22 - 25, characterized in that the luminophore particles are applied onto thermal transfer films and transferable to printable material by means of transfer printing.

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29. A zinc sulfide electroluminophore according to one or more of claims 22 - 25, characterized in that the luminophore particles are embedded in thermoplastic granule matrixes and processed into films by means of extrusion/coextrusion and/or thinfilm-casting.

30. Use of a zinc sulfide electroluminophore having an average grain size of 5 to 20 μm for screen printing.

31. Use of a zinc sulfide electroluminophore having an average grain size of 2 to 5 μm for application in intaglio or offset printing.

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